

T.6 MMR Compression Software

T.6 is the ITU-T recommendation which uses the MMR two-dimensional compression coding technique to be used in the Group 4 black and white facsimile. The ITU-T standard T.6 is designed for error-free digital facsimile transmission mainly on public data networks. This specification has been widely used in document imaging systems for compressing black and white images. It is sometimes referred to as the ITU-T Group 4 compression standard.

The T.6 facsimile coding standard consists of this basic facsimile coding scheme and future optional facsimile coding schemes. It is assumed that transmission errors are corrected by control procedures at a lower level. Therefore, T.6 is a noiseless coding scheme. Since the T.6 coding scheme is designed for noise free transmission, a single bit error can cause corruption of the image. Compared to the ITU-T T.4 coding scheme, this scheme is very sensitive to error, and is less robust.

The T.6 coding scheme is known as the Modified Modified Relative element addresses designate code (MMR). The basic facsimile coding scheme uses a two-dimensional line-by-line coding method, the position of each changing picture element on the current coding line is coded with the respect to the position of a corresponding reference element located on either the coding line or the reference line. The reference line is immediately above the coding line. After the coding line has been coded, it becomes the reference line for the next coding line and the reference for the first line of a page is an imaginary white line. This coding scheme is the same as the two-dimensional coding scheme of Group 3 facsimile specified in T.4, except the first line is encoded differently, and in the Group 3 two-dimensional coding scheme, every Kth line (K=2 or 4) of image data must be encoded by the Group 3 one-dimensional coding scheme.

The one-dimensional coding scheme of Group 3 facsimile makes use of only horizontal dependencies between picture elements in the same scan line. The advantage of the T.6 coding scheme over the one-dimensional coding scheme of Group 3 facsimile is that it exploits both horizontal and vertical dependencies, resulting in the greater compression efficiency. Since the T.4 two-dimensional coding scheme requires that every Kth line of image data must be encoded by the one-dimensional coding scheme, it is less efficient compared to the T.6 coding scheme.

This T.6 Group 4 encoding is much more complex. As mentioned earlier, each scanline is compared with the previous one - in this way, vertical features in the source image can be used to achieve better compression ratios. Rather than considering the alternating white and black runs in each scanline, it considers the positions of changing pixels, in other words the positions of the first pixel in each run. Although these are effectively one and the same thing, Group 4 uses the position of the changing pixel relative to that of the one on the previous line as the coding scheme, rather than comparing relative run lengths.

Floreat's fax modem protocols are modular, re-locatable and re-entrant to support multi-channel capability. This protocol software can operate within a multi-tasking environment or as a single task and it is supported on various DSPs and processors as well as offered in fixed and floating point C.

Floreat's Fax Modem protocols can be integrated with Floreat's other data modem, telephony, speech compression, VoIP, FoIP, imaging and video software for various applications.

Floreat supports its software on the following DSPs, Controllers and Processors

- TI C5000 and C6000
- Intel Pentium fixed and floating point and XScale
- ADI Blackfin (BF53x), SHARC 21xxx
- ARM 7/9/9E, MIPS
- PowerPC, STM, SuperH cores, Philips Nexperia
- CEVA (formerly DSPG's licensing division)
- Ported by customers to their processors:
 - NEC
 - STM
 - Zilog

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